Painful Peripheral Neuropathy

Painful peripheral neuropathy is a common neurological disorder characterized by numbness, weakness, tingling and pain, often starting in the hands or feet.

Prevalence and Incidence of Neuropathic Pain and Peripheral Neuropathy

The American Chronic Pain Association estimates that more than 15 million people in the U.S. and Europe have some degree of neuropathic pain. More than two out of every 100 persons are estimated to have peripheral neuropathy; the incidence rises to eight in every 100 people for people aged 55 or older. (1)

Symptoms of Painful Peripheral Neuropathy

Symptoms and prognosis vary between types of peripheral neuropathy. Generally, there is constant or recurring pain. The pain sensations are variable, and may feel like a stabbing sensation, pins and needles, electric shocks, numbness, or burning or tingling. Symptoms in diabetic polyneuropathy and other generalized neuropathies typically start in the hands or feet and climb towards the trunk. Often the pain is most troublesome at night and can disturb sleep.

The sensations may be more severe or prolonged than would be expected from a particular stimulus. For example, someone who has facial pain from trigeminal neuralgia (tic doloreaux) may find it excruciating to have something brush across a cheek.

Qualitatively the pain may feel different than pain caused by a normal injury. For one reason, neuropathy may affect not only nerves that transmit pain messages, but also non-pain sensory nerves that transmit other tactile sensations, such as vibration or temperature.

Painful peripheral neuropathy may also occur along with damage to motor nerves, or to autonomic nerves that govern basic physiological states, such as blood pressure – both of which cause non-sensory symptoms, such as muscle weakness or lightheadedness.

More than one process may go awry and set the condition in motion. Following an injury or illness, nerve endings may become sensitized and signal pain in the absence of painful stimuli. In some types of neuropathy, a nerve cell outer sheath, the myelin coating, degenerates, which disrupts normal transmission of nerve signals.

Diagnosis of Peripheral Neuropathy

Diagnosis of painful peripheral neuropathy may require several steps. An exam will involve taking a complete patient history; checking tendon reflexes, muscle tone, motor function and the sense of touch; collecting urine and blood specimens to screen for metabolic or autoimmune disorders; and tests to determine the nature and extent of nerve damage.

Follow-up tests may include an electroencephalogram (EEG) that records electrical activity of the nervous system; a spinal tap to test for breakdown of myelin; brain scans using computed tomography (CT) and/or magnetic resonance imaging (MRI); nerve conduction velocity testing to see how fast electrical signals move; and electromyography, which measures the electrical impulses of muscles at rest and during contraction. A biopsy may also be ordered to inspect the extent of nerve damage.

Treatments for Peripheral Neuropathy

Once neuropathy has developed, few types can be fully cured, but early intervention can improve outcomes. Peripheral nerve fibers can slowly regenerate if the nerve cell itself is still alive. Eliminating the underlying cause can prevent future nerve damage. Good nutrition and reasonable exercise can speed healing. Quitting smoking will halt constriction of blood vessels, so that they can deliver more nutrients to help repair injured peripheral nerves.

Mild pain may be relieved by over-the-counter analgesic medication. For patients who have more severe neuropathic pain, neuroactive agents such as anticonvulsants or antidepressants are commonly prescribed; their action on the central nervous system can calm nerve activity. Topical patches that act across the skin – for instance, delivering the anesthetic lidocaine or chili-pepper extract capsaicin – may also provide some relief. Another option is administration of a local anesthetic.

When pain does not respond to those methods, alternatives can include cannabinoids or opiate analgesics. If these measures are ineffective, in a small, select group of patients, opioids may be gradually introduced after carefully considering concerns and side effects. (2) Meanwhile, to relieve the most severe cases of neuropathic pain, nerves may be surgically destroyed, although the results might be only temporary and the procedure can lead to complications.

For some patients, a treatment regimen will also include physical or occupational therapy to rebuild strength and coordination.

Neuromodulation May Be an Option

In cases in which drugs are ineffective or side effects intolerable, an option for some patients may be use of an implanted electrical stimulator to interrupt pain signals by producing a mild tingling sensation (paresthesia) in the painful area. Neuromodulation for intractable peripheral neuropathic pain may be carried out through spinal cord stimulation or through peripheral nerve stimulation.

Spinal cord stimulation starts with a trial phase. A permanent implant is generally offered to candidates if the temporary implant reduces pain from 50-70%. For appropriately screened patients, meanwhile, peripheral nerve stimulators can have an 80% to 90% near-term success rate. (3-5)

In patients who eventually develop a tolerance to neurostimulation, a potential future option is delivery of a pain-relief agent to targeted sites in the body using an intrathecal drug delivery system. For instance, ziconotide, a non-opiate drug now often employed to treat complex

regional pain syndrome, has been suggested by specialists as a possibly viable alternative pain-relief agent. (6)

Many Peripheral Neuropathy Types, Multiple Causes

There are more than 100 different types of peripheral neuropathy, according to the U.S. National Institute of Neurological Disorders and Stroke (NINDS). The condition can either be inherited, or develop due to injury or illness.

Some 30% of peripheral neuropathies occur as a complication of diabetes, and an estimated 26% of patients with diabetes have some degree of diabetic neuropathy, due to prolonged effects of high blood sugar levels. In another 30% of cases, the precise cause of a painful peripheral neuropathy is unclear (or "idiopathic"). Other neuropathy causes include physical injury to a nerve, tumors, exposure to toxins, alcoholism, kidney failure, autoimmune responses, nutritional deficiencies, shingles, HIV infection, and vascular or metabolic disorders. (7)

If only one nerve is affected, the condition is called mononeuropathy. If several nerves are involved, the disorder is called mononeuritis multiplex, and if the condition affects both sides of the body, it is called polyneuropathy. The condition may be general, or located in a particular area, which is called focal peripheral neuropathy.

Focal or Multifocal Peripheral Neuropathies

Focal or multifocal peripheral neuropathies include:
Carpal tunnel syndrome (caused by pressure on the nerve due to inflammation from repetitive stress), or other so-called "entrapment" syndromes
Radiculopathies, including sciatica (a shooting pain in the arms or legs due to irritation or compression of the nerve root in the spine)
Phantom limb pain and stump pain
Post-traumatic neuralgia
Postherpetic neuralgia (7)

Generalized Polyneuropathies

Generalized polyneuropathies are more common, and can be present due to:
Diabetes mellitus
Demyelinating conditions (Guillain-Barre Syndrome; chronic inflammatory demyelinating polyneuropathy; Charcot Marie Tooth Disease Type I or II)
Alcoholism
Autoimmune disease (rheumatoid arthritis, lupus)
HIV (caused by the virus itself, by certain drugs used in the treatment of HIV/AIDS or its complications, or as a result of opportunistic infections) (8)
Vitamin B deficiency
Toxin exposure (which may include some chemotherapy drugs or anti-retroviral agents; illicit drug use, such as glue-sniffing; or exposure to heavy metals found in industrial settings such as arsenic, lead, mercury, and thallium) (9)

Irrespective of the type of peripheral neuropathy, most patients will notice some improvement in their symptoms over time, if a holistic treatment approach is maintained, but they will require careful interdisciplinary monitoring and follow-up.

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